

REMARKS

Applicants thank the Examiner for the thorough consideration given the present application. Claim 1-4 and 6-16 are currently being prosecuted. The Examiner is respectfully requested to reconsider his rejections in view of the amendments and remarks as set forth below.

Allowable Subject Matter

It is gratefully acknowledged that the Examiner considers the subject of claims 9 and 10 as being allowable if re-written to overcome the indefiniteness rejection. At this point, Applicants have not re-written these claims as suggested by the Examiner but instead have amended the independent claim from which they depend.

Rejection under 35 USC 112

Claims 1-15 stand rejected under 35 USC 112, second paragraph, as being indefinite. This rejection is respectfully traversed.

The Examiner objected to the claims as being narrative and indefinite. The Examiner points out the claim 1 includes both comprising and characterized language. By way of the present amendment, Applicants have amended claim 1 to only using the comprising terminology. Applicants have also amended the dependent claims to change "characterized in that" to "wherein".

The Examiner objected to claim 5 due to the term "complex, spatial geometry". By way of the present amendment, this claim has been canceled rendering this rejection moot. However, Applicants have placed this language in claim 1 but have removed the word "complex". Applicants submit that the term "spatial geometry" is a definite term and clearly refers to the presence of the three dimensional object. Accordingly, Applicants submit that the language is now clear.

The Examiner objected to claim 12 due to the phrase "etc." By way of the present invention, Applicants have amended this claim to not only remove the word "etc." but also to remove the "for example" phrase completely.

The Examiner objected to claim 14. Applicants have re-written this claim in independent form to include the limitations of claim 1 so that this is now an independent system claim.

The Examiner also rejected claim 15, as referring to the treatment system of claim 14 and the applicator of claim 1. Applicants have now revised claim 15 to incorporate the system of claim 14. Applicants submit that this claim is now definite.

Rejection under 35 USC 101

Claim 15 also stands rejected under 35USC 101 as claiming a use without setting forth any steps of the process. By way of the present amendment, Applicants have amended claim 15 to now include a complete recitation rather than depending on claims 1 and 14. Accordingly, Applicants submit that this rejection is also overcome.

Rejection under 35 USC 102

Claims 1, 2, 5, 8 and 11 stand rejected under 35 USC 102 as being anticipated by Tang et al. (US Patent 5,729,583). This rejection is respectfully traversed.

The Examiner states that Tang et al. teaches a device for performing radiation therapy having an x-ray emitting surface with a vacuum cavity 14, an anode 12, a cathode 11, an emitting means, an electric field means and a vacuum cavity. The Examiner considers the cathode and anode as being plate shaped elements. Applicants submit that claim 1, as amended, is not anticipated by this reference.

The Tang et al. device describes a miniature x-ray emitting device. The cathode is constructed as point shaped electron emitting surface resulting in x-ray radiation being generated in and emitted by the anode with a point like beam shaped dose distribution. The collimator 22 (Figures 8 and 9) is used to absorb off-axis x-ray radiation and to emit a collimated x-ray beam traveling in alignment with the longitudinal axis of the device. Thus, the device of Tang et al. is not a brachytherapy applicator but rather a miniature x-ray source.

In the prior art, x-ray devices are introduced into a patient's body through a catheter tube toward a specific location for performing the radiation treatments. Thus, in these arrangements the catheter tube itself is the brachytherapy applicator and the x-ray source is used for

radiotherapy, so that the source must be displaced in at least in one direction through such an applicator. The dimensions of the x-ray source must be smaller than the applicator, i.e. the catheter tube and therefore must be a miniature source with limited constructional dimensions. In order to generate a tumor conformal dose profile which covers the complete tumor tissue area, the x-ray source has to be moved step by step inside or through the applicator and within the treatment area to be radiated. Due to the small dimensions and the need to displace the x-ray device through the applicator tube, the x-ray source device must be regarded as a point like source of x-ray radiation. The x-ray radiation being emitted as a small beam exhibits a confined dose distribution directed to a small tissue region. Known applicators such as catheter tubes have another surface in contact with the body tissue and hence maintain the emitting source at a certain distance from the tumor tissue.

In preamble, in claim 1, the device is described a brachytherapy applicator which is not the case in Tang et al. Further, the plate shaped elements are described as having longitudinal dimensions greater than the distance between the anode and cathode. Also, the emitting surface is brought into direct contact with the tissue to be treated so that the dose distribution is conformal to the spatial geometry of the vacuum cavity. This is clearly not seen in Tang et al. where the dimensions are much smaller and there is no contact between the emitting surface and the tissue.

As a result, it is not necessary in the present device to displace the x-ray source in a step-wise manner in the applicator in order to cover the entire tissue area to be treated. As a result, the applicator is brought into direct contact with the tissue to be treated so the total outer surface of the device serves as an x-ray emitting surface. This avoids the need to displace the x-ray emitter to cover the entire tumor tissue. As a result, the brachytherapy applicator contains no moving parts which simplifies the device. For these reasons, Applicants submit that claim 1 is not anticipated by Tang et al.

Claims 1, 2, 5-8 and 11 stand rejected under 35 USC 102 as being obvious over Ribbing et al. (US Patent 6,477,233). This rejection is respectfully traversed.

The Examiner states that the Ribbing et al. reference includes the cathode and anode which are considered to be plate shaped elements.

Applicants submit that the Ribbing et al. device is another point shaped emitter similar to Tang et al. As seen in column 1, line 60-64, the pointed tip results in an x-ray radiation being emitted only with a beam shaped dose distribution. Thus, Ribbing et al. performs point like radiation treatment in a confined area such as a vessel for treating stenosis and restenosis.

Applicants submit that Claim 1 defines over Ribbing et al. for the same reasons recited above with regard to Tang et al. Ribbing et al. also does not show a brachytherapy applicator. Further, Ribbing et al. does not teach the plate shaped elements as having longitudinal dimensions greater than the distance between the cathode and anode. This reference also does not teach that the surface of the applicator is brought into direct contact with the tissue to be treated so that x-ray radiation has a dose contribution conformal to the spatial geometry of the vacuum cavity. Accordingly, Applicants submit that claim 1 defines over this reference as well.

Claims 2-13 depend from claim 1 and as such are also considered to be allowable. In addition, each of these claims recite other features that make them additionally allowable. In particular, the Examiner has not applied these rejections to claims 3, 4, 9, 10, 12 and 13. Accordingly, Applicants submit that these claims are additionally allowable.

Claim 14 stands rejected under 35 USC 102 as anticipated by Kindlein et al. (EP 1 316 330). This rejection is respectfully traversed.

The Examiner says that Kindlein shows a brachytherapy treatment system having a dose planning device or treatment planning system, a control means, one or more radiation detectors, which provide feedback information. Applicants submit that claim 14 is not anticipated by this reference. Claim 14 has now been amended to include all the limitations of claim 1. Accordingly, Applicants submit that Kindlein does not show the specific description of the applicator as presently claimed in claim 14. Accordingly, Applicants submit that this claim is additionally allowable.

Rejections under 35 USC 103

Claims 3, 4, 12 and 13 stand rejected under 35 USC 103 as being obvious over Tang et al. over Ribbing et al. in view of Chornenky et al. (EP 0 860 180). This rejection is respectfully traversed. The Examiner admits that the primary references do not show the use of the getter material with the vacuum cavity. The Examiner relies on Chornenky et al. to teach that the use of the getter is well known and a common feature in vacuum cavities. The Examiner feels that it would be obvious to modify the primary references to use the getter material in view of the teachings of Chornenky et al. The Examiner also feels that it would be obvious to provide holes in any desired shape and would be a matter of routine design choice.

Applicants submit that Chornenky et al. cannot be considered to be relevant to the present invention since it also describes a miniature x-ray device with a cathode constructed as a point shaped electron emitting surface resulting in a x-ray radiation being generated and emitted by the anode in a point like beam shaped radiation dose distribution. Chornenky et al. also does not describe the brachytherapy applicator. Even if the reference does teach the use of the getter material, the Examiner has not even alleged that the reference teaches that the getter material is provided on the surface of the first plate shaped element facing away from the second plate shaped element nor that the first plate shaped elements is provided with an opening exposing the getter material to the cavity. Applicants submit that the references do not show this particular structural feature. Furthermore, concerning the openings, it is noted that the openings of claim 12 and the disc shaped elements of claim 13 relate to the control of the emission of the radiation. Thus, Applicants submit that this is not merely an engineering design choice for providing a particular shaped opening. The size and arrangement of the openings or discs control the emission of the radiation and accordingly would not be obvious and would not be a routine design choice.

Conclusion

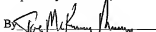
In view of the above remarks, it is believed that the claims clearly distinguish over the patents relied on by the Examiner, either alone or in combination. In view of this, reconsideration of the rejections and allowance of all the claims are respectfully requested.

Should there be any outstanding matters that need to be resolved in the present application, the Examiner is respectfully requested to contact Robert F. Gnuse Reg. No. 27,295 at the telephone number of the undersigned below, to conduct an interview in an effort to expedite prosecution in connection with the present application.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37.C.F.R. §§1.16 or 1.14; particularly, extension of time fees.

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Respectfully submitted,

By 

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